

Rogue River Sediment Evaluation

Abstract

On July 3, 1997 nine sediment samples were collected, using a Ponar grab sampler, from the Rogue River Project (RRP) and potential new access channel and were submitted for physical analysis (see Figure 1). The RRP samples included samples RR-P-1 & 2 and RR-P- 5 through 7. Physical analysis for samples 1 & 2, from the main channel, were primarily poorly graded sand, with few fines, to poorly graded gravel, with no fines, respectively. Samples 5-7 taken from the boat basin access channel increase in percent fines from the main channel to the boat dock. At sample location #5, percent fines were 30.6%, at sample #6 location 61.1% fines and 85.4% at sample location #7. The samples RR-P- 3 & 4 and samples RR-P-8 & 9 were taken from the proposed new boat basin access channel. Samples 3 & 8 were primarily gravel, sample #4 was silty sand and sample #9 taken close to the dock was 84.1% fines. Five of the samples collected were also selected for chemical analysis. Chemical analysis include metals, polynuclear aromatic hydrocarbons (PAHs), total organic carbon (TOC), acid volatile sulfide (AVS), pesticides/polychlorobiphenyls (PCBs). All chemical and physical analyses for this material indicate that it is suitable for offshore ODMDS disposal with no adverse environmental impact expected.

Introduction

1. The Rogue River discharges into the Pacific Ocean 32 miles north of the California State border. The drainage basin is 5,100 mi² and is the largest of Oregon's coastal rivers (1).
2. The authorized Federal Project at the mouth of the Rogue consists of a channel 13 feet deep and 300 feet wide (see Figure 1). It runs from deep water in the ocean for approximately 3,500 feet to the entrance of the Gold Beach boat basin access channel. The boat basin access channel is 10 feet deep and 150 feet wide into the boat basin. The channel can be shifted as needed to take advantage of the deepest water available (2).
3. Because the mouth is a high energy area, a large shoal usually develops during spring and summer between the north and south jetties. This shoal migrates up the channel on the south side restricting navigation into and out of the Gold Beach boat basin.
4. The sediment of the Rogue River project was evaluated in 1982 and 1992 (3,6). In 1982 the sediment at the mouth was composed of very coarse sand with some gravel and cobbles. The volatile content was less than 2.0% while that of the samples taken from the boat basin access channel were roughly 4.0 to 8.0%. Results from the 1992 tests followed the same basic pattern as those from 1982 and corroborated them (6). Concentration of potential contaminants in bulk sediment and elutriates were below established concern levels. There were no known sources of contaminants in the nearby area. The sediment was judged acceptable for unconfined in-water and upland disposal according to regulations promulgated in section 102 and 103 of the Marine Protection Research And Sanctuaries Act (MPRSA) and

section 404 of the clean Water Act (CWA). The material has been disposed at an offshore Ocean Dredged Material Disposal Site (ODMDS) and onto the surf zone of a nearby beach located south of the south jetty.

5. Rogue River sediment from the entrance channel, as noted, is gravelly coarse sand and relatively low (0.00 -2.15 %) in organic material. Some material from the turning basin and potentially new access channel contained from 15.6 to 85.4 % fines and were subjected to physical and chemical analyses to update our knowledge of its condition and suitability for unconfined in-water or upland disposal, in compliance with the Clean Water Act and Ocean Dumping Act.

Methods

6. On July 3, 1997 nine samples, RR-P-1 through RR-P-9, were taken from the Rogue River shoals at locations indicated on site map (Figure 1). The samples were taken by U. S. Army Corps of Engineers personnel using a Ponar sampler. Samples for physical analysis were placed in plastic zip lock bags and samples for chemical analysis in pre-cleaned, EPA approved, glass jars. Samples were held at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$, as required by EPA for environmental samples, prior to shipping to the laboratory. Physical samples were analyzed by U.S. Army Corps of Engineers Materials Lab, Troutdale, Oregon for grain size distribution and volatile solids content. Five samples selected for chemical analysis were shipped to Columbia Analytical Services, Inc. (CAS), Kelso, Washington for heavy metals analysis, including bulk tributyltin (TBT), total organic carbon (TOC), polynuclear aromatic hydrocarbon (PAH), pesticides/polychlorobiphenyls (PCBs), acid volatile sulfides (AVS). All samples and analysis were performed according to EPA/USACE approved methods (7). Quality control (QC) standards were run by CAS laboratory.

Results

7. The results of physical analysis are shown in Table 1. Samples collected are considered representative of the material to be dredged.
8. The concentrations of inorganics are shown in Table 2. The concentration of metals are below established concern levels (8) except for nickel (Ni) in all samples. Nickel levels have historically been higher in Rogue River sediments than in other coastal estuaries. Current results compare to those taken in 1992 (4). High levels of AVS will help bind heavy metals and reduce their toxicity.
9. The results of organic analysis are shown in Table 3 & Table 4. All concentrations of organics were below established concern levels.
10. The results of physical and chemical analyses of the sediment confirm earlier studies and indicate that Rogue River sediment has not degraded significantly over the years. The

material, except for the fine grained inner harbor sediments, is similar to that at the offshore ODMDS and beach disposal site. This and previous sediment quality evaluations have concluded that no unacceptable, adverse environmental impacts would be expected from its disposal.

Recommendations

11. According to provisions of the Clean Water Act and the Ocean Dumping Act the sediment from Rogue River is acceptable for both unconfined in-water and upland disposal. Results from this and earlier studies show that no unacceptable adverse environmental impacts would be expected from its disposal.

References

1. Percy, K.L., Bella, D.A., Sutterlin, C., Klingeman, P.C. 1974. Descriptions and information Sources for Oregon Estuaries. Sea Grant College Program, Oregon State University.
2. Navigation Branch, Operations Division, U. S. Army Corps of Engineers, Portland District. September 1991. Federal Navigation Projects: Columbia River Maintenance Disposal Plan. (Prepared by Mandaville Associates, 600 S. W. Tenth #418, Portland, Oregon 97205)
3. U. S. Army Corps of Engineers. April 1982. Sediment Physical and Chemical Characteristics Rogue River Federal Navigational Project: April 1992.
4. Britton J. U. S. Army Corps of Engineers, Portland district. October 1992. Physical and Chemical Characteristics of Sediment From the Gold Beach Boat Basin on the Rogue River. Prepared for EPA, Region 10, Seattle, Washington.
5. U. S. Army Corps of Engineers, Portland district. October 1988. Rogue Ocean Dredge Material Disposal Site Evaluation. Final Report.
6. U. S. Army Corps of Engineers, Portland district. October 1992. Rogue River Sediment Evaluation.
7. U. S. Environmental Protection Agency and U. S. Army Corps of Engineers. February 1991. Evaluation of Dredge Material proposed for Ocean Disposal (Testing Manual).
8. U. S. Army Corps of Engineers, Portland District. November 1991. Levels of Concern Tier II Analysis. (A list of chemicals and associated concern levels in bulk sediment, established as a temporary guideline useful in evaluating toxicity of sediment. These levels of concern are subject to change as new information warrants.)

Table 1

Rogue River Sediment - Physical Analysis

sample	mm	%			
	median grain size	sand	silt	clay	volatile solids
RR-P-1	0.180	98.9	*	*	1.3
RR-P-2	39.300	100.0	*	*	0.0
RR-P-3	37.400	98.8	*	*	0.0
RR-P-4	0.480	84.4	10.8	4.8	2.6
RR-P-5	0.120	69.3	26.2	4.4	6.0
RR-P-6	0.420	38.9	45.6	15.5	7.0
RR-P-7	0.016	14.6	67.7	17.7	6.3
RR-P-8	61.100	100.0	*	*	0.0
RR-P-9	0.029	15.9	73.0	11.1	5.3

*NOTE: No hydrometer analysis performed

Table 2

Rogue River Sediment - Metals including Tributyltin Analysis (TBT), Total Organic Carbon (TOC), Acid Volatile Solids (AVS)

	Cd	Cr	Co	Cu	Pb	Hg	Ni	Ag	Zn
	ppm								
RR-P-4	0.12	111.00	15.60	24.40	3.99	<0.02	237.00	0.05	42.40
RR-P-5	1.03	146.00	30.30	44.40	9.19	0.10	281.00	0.13	68.10
RR-P-6	0.16	99.50	20.20	42.60	6.50	0.08	176.00	0.09	58.50
RR-P-7	0.20	96.10	21.10	47.20	7.58	0.10	179.00	0.11	61.80
RR-P-9	0.19	95.70	21.40	46.60	7.12	0.10	166.00	0.10	62.30
Screening level:	0.96	180	*	81	66	0.21	140	1.2	160

	TBT	TOC	AVS
	ppb	%	ppm
RR-P-4	0.5	0.82	350.0
RR-P-5	3.0	2.15	510.0
RR-P-6	<0.4	1.92	200.0
RR-P-7	<0.4	1.94	240.0
RR-P-9	<0.4	1.63	95.0
Screening level:	73	N/A	N/A

* EPA, Region 10 Screening level not established.

Table 3

Rogue River Sediment - Organic Analysis

PCB - 7 arochlor analytes (ppb)		Pesticides - *19organochlorine analytes (ppb)			
		delta-BHC	4,4'-DDE	4,4'-DDD	4,4'-DDT
RR-P-4	ND	<0.4	<0.4	<0.4	<0.2
RR-P-5	ND	0.8	<0.4	<0.4	<0.2
RR-P-6	ND	0.8	1	1	1
RR-P-7	ND	<0.4	0.4	<0.4	<0.2
RR-P-9	ND	<0.4	0.6	<0.4	<0.2
Screening limit:	130	10		Total DDT	6.9

ND = none detected

* table shows only analytes where detection was noted in at least one sample.

Table 4a

Rogur River Sediment - Organic Analysis (cont'd)

Polynuclear Aromatic Hydrocarbons (PAH) - 8 (low density) analytes

	Acenaphthene	Acenaphthylene	Anthracene	Dibenzofuran	Fluorene
RR-P-4	<0.5	<0.2	1	2	2
RR-P-5	<0.5	<0.2	<0.6	10	9
RR-P-6	<0.5	<0.2	2	4	4
RR-P-7	<0.5	<0.2	4	6	6
RR-P-9	<0.5	<0.2	1	3	3
Screening level:	63	64	130	54	64

	2-Methylnaphthalene	Naphthalene	Phenanthrene	Total Low PAHs
RR-P-4	12	7	11	35
RR-P-5	44	16	54	133
RR-P-6	19	12	19	60
RR-P-7	29	17	33	95
RR-P-9	16	10	15	39
Screening level:	67	210	320	610

Table 4b

Rogue River Sediment - Organic Analysis (cont'd)

Polynuclear Aromatic Hydrocarbons (PAHs) - 10 (high density) analytes

	Benz(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Benzo(a)pyrene
RR-P-4	1	3	1	3	2
RR-P-5	2	6	2	4	2
RR-P-6	2	4	2	3	2
RR-P-7	4	7	4	3	4
RR-P-9	2	4	2	2	2
Screening level:	450	[800]		540	680
	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Pyrene
RR-P-4	4	<0.5	5	1	5
RR-P-5	11	<0.5	8	<0.7	11
RR-P-6	5	<0.5	8	<0.7	10
RR-P-7	9	<0.5	23	1	20
RR-P-9	6	<0.5	11	1	10
Screening level:	670	120	630	[430]	
Total High PAHs					
RR-P-4	25				
RR-P-5	46				
RR-P-6	35				
RR-P-7	75				
RR-P-9	40				
Screening level:	1,800				

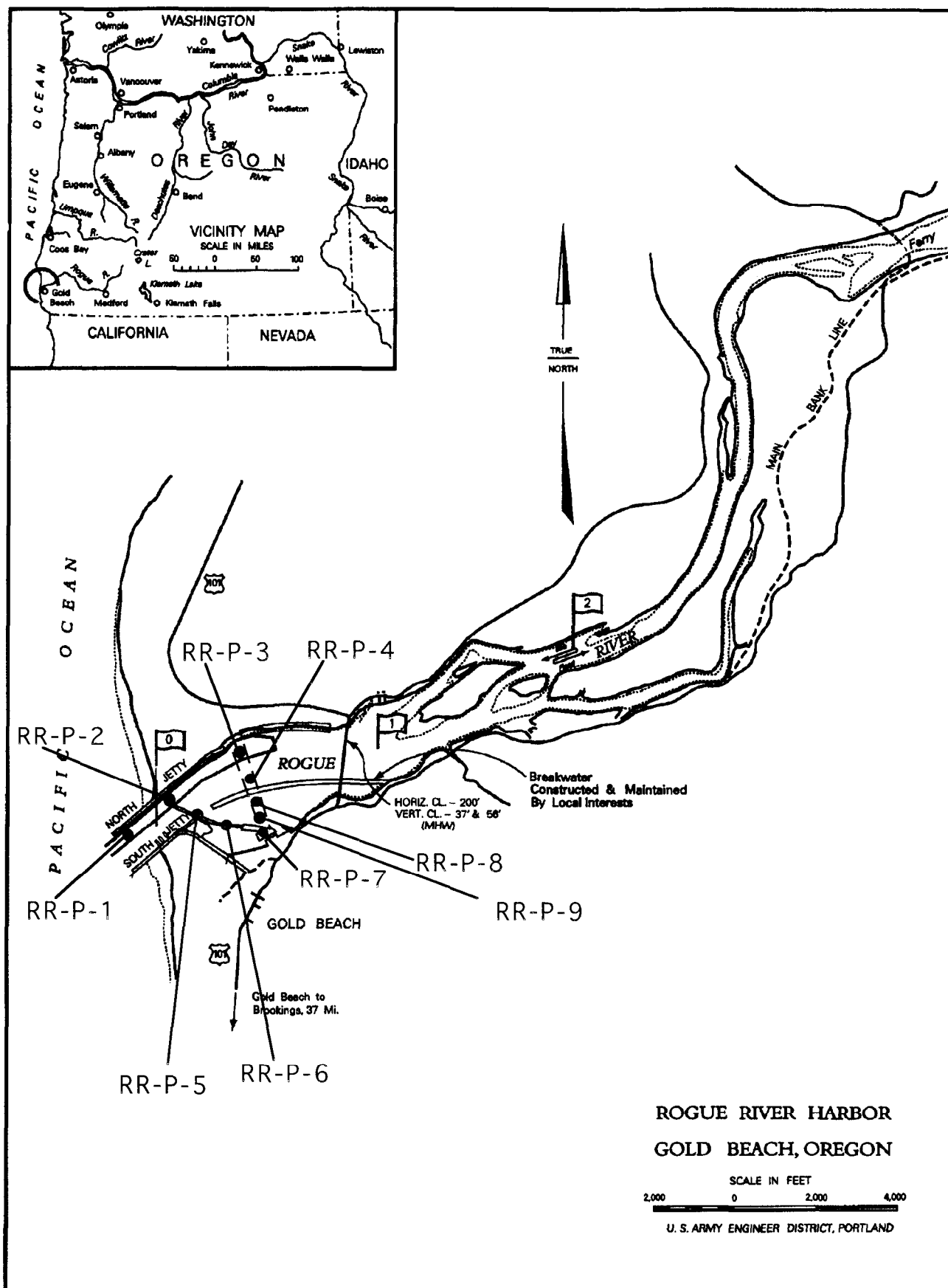


Figure 1: Rogue River Sediment Sampling Site Map, 1997.